

**REMARKS**

The applicants have carefully studied the outstanding Office Action. Because of the extent of the amendments which the applicants wish to make in response to the Office Action, the applicants have preferred to cancel without prejudice all of the claims currently on file, and to submit a new claim set, claims 112 to 190. Claim 112 is a new independent claim, while claims 113 to 178 are claims dependent thereon, with dependencies which largely follow the recitations of the claims in the originally filed claim set. Claim 179 is equivalent to claim 24 of the originally filed claims, rewritten in independent form as proposed by the Examiner. Claim 180 is an independent claim, similar in scope to claim 112, but reciting that the reference chambers contain a reference gas comprising one of the first and second isotopic components. Claim support in the specification for the elements of the new claim 112 is delineated below.

The applicants express their appreciation to Primary Examiner Robert L. Nasser for the courtesy of an interview which was granted to the applicant's representative, Sanford T. Colb (Reg. No. 26,856). The interview was held at the Examiner's office at the USPTO on July 1, 2003. The substance of the interview is set forth in the Interview Summary, Paper No. 11, given to the applicant's representative.

At the interview, new claim 112 was presented to the Examiner, in a proposed amendment dated June 27, 2003, the claim reciting two chambers, each of which has a reference gas comprising both first and second isotopic components. The applicant's representative noted that the Kubo prior art shows only one chamber, and that in column 17, lines 21-23, states that the reference gas has no absorption at the measurement wavelength. The Examiner agreed that the claim proposed defined over Kubo, pending an updated search.

However, in preparing the amendment for filing, the applicants have made some amendments to the language of claim 112 proposed to the Examiner at the interview, to correct some potential lack of clarity in that originally proposed claim.

The applicants respectfully submit, though, that the claim 112 currently being filed contains essentially the same elements to those of the claim proposed to the Examiner, but linguistically rearranged, and includes the recitation of two chambers, each of which has a reference gas comprising both first and second isotopic components, which the Examiner stated as defining over Kubo, pending an updated search. The applicants therefore respectfully submit that the agreement reached at the interview should therefore also be considered as applicable to the new claim 112 filed herewith. New independent claim 180, however, filed herewith, recites that the reference chambers contain a reference gas comprising one of the first and second isotopic components, which differs from the claim discussed at the interview.

The applicants believe the new claim set to be fully responsive to all points of rejection raised by the Examiner to the originally filed claims, and to place the application in condition for allowance. Favorable reconsideration and allowance of the application are respectfully requested.

#### **Claim rejections - 35 USC § 112**

Claims 42 and 50 are rejected under 35 U.S.C. 112, second paragraph, for failing to particularly point out and distinctly claim the subject matter which the applicants regard as the invention, as they are duplicates of each other. The applicants submit that the Examiner's rejection is moot in the light of the cancellation without prejudice of these claims. The applicants have been watchful to avoid such duplication in the newly filed claim set.

#### **Claim rejections - 35 USC § 102**

Claims 1, 3, 5, 7, 11-13, 18, 42-44, 50, 59, 67, and 70-73 stand rejected under 35 USC § 102(e) as being anticipated by US 5,964,712 to Kubo et al. The Examiner states that "Kubo et al shows an isotopic gas analyzer that takes the ratio of  $^{13}\text{CO}_2$  to  $^{12}\text{CO}_2$  in human breath with two wavelength stable light sources and a detector

for detecting the absorption by each species.”

The applicants respectfully submit that the Examiner’s rejection is moot in the light of the cancellation of these claims. However, the applicants further submit that the isotopic gas analyzer disclosed in Kubo et al. differs from that recited in new independent claim 112 of the present application, in a number of aspects.

The analyzer of Kubo et al. utilizes only one reference chamber, described in col. 18, line 38, as “the reference cell 11c”, and as shown in associated Fig. 7. In contrast to the single reference chamber described in Kubo et al., new claim 112 of the present application recites “....at least a first reference chamber ....” and “... at least a second reference chamber ...”, which, to the best of the applicants’ understanding, is nowhere shown or suggested in Kubo et al.

Additionally, the reference cell of Kubo et al. contains a reference gas “having no absorption at a wavelength for measurement, e.g. nitrogen gas”, as stated in col. 17, lines 21-23. In contrast to the reference gas described in Kubo et al., new claim 112 of the present application recites “a first reference chamber containing a reference gas comprising said first and second isotopic components”, and a similar recitation for the second reference channel. Similarly, new claim 180 of the present application recites “a first reference chamber containing a reference gas comprising at least one of said first and second isotopic components”, and a similar recitation for the second reference channel.

In view of the above-stated arguments, the applicants respectfully submit that at least two different elements are recited in new claim 112, which are not shown or suggested in the Kubo et al. gas analyzer. New claim 112 is not therefore anticipated by what is shown in Kubo et al., and is deemed to be allowable. New claims 113 to 178 are dependent on new claim 112, and recite further patentable matter, and are therefore also deemed to be allowable. By similar reasoning, the applicants submit that new claim 180 is also not anticipated by what is shown in Kubo et al., and is deemed to be allowable. New claims 181 to 190 are dependent on new claim 180, and recite further patentable matter, and are therefore also deemed to be allowable.

**Claim rejections - 35 USC § 103(a)**

Claims 2, 4, 6, 19-21, 25, 34, 36, 48, 60 and 61 stand rejected under 35 U.S.C. 103 (a) as being unpatentable over Kubo et al., in view of Rosenfeld et al. (U.S. Patent No. 4,755,675). The Examiner states that “Kubo does not use a gas discharge lamp. Rosenfeld et al is a gas analyzer that does. From this teaching, it would be obvious to modify Kubo et al to use a gas discharge lamp, as it is merely the substitution of one known light source for another.”

The applicants respectfully submit that the Examiner’s rejection is moot in the light of the cancellation without prejudice of these claims. However, the applicants further submit that, with regard to new claims 120-121 and 123-124 and their dependents, which do recite a gas discharge tube, the use of a gas discharge tube in the analyzer of Kubo et al should not be considered a simple substitution of one known light source for another, since such use would entail other structural changes to the analyzer of Kubo et al., such as the removal of the wavelength selection filters. Furthermore, although Kubo et al. does state in col. 17, lines 62-63, that the generation of the infrared rays may be achieved in any way, no indication or suggestion is given anywhere in Kubo et al., to the best of the applicants’ understanding, of using any specific source other than the blackbody source actually described therein.

Claims 15-17 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kubo et al., in view of Cooper et al. (U.S. Patent No. 5,317,156). The Examiner states that “Kubo et al has a reference cell, but alternates measurements, rather than having two separate channels. Cooper et al shows two channels a measurement channel and a reference channel. From this teaching, it would have been obvious to modify Kubo to use 2 parallel channels, as it is merely the substitution of one known equivalent arrangement for another.”

The applicants respectfully submit that the Examiner’s rejection is moot in the light of the cancellation without prejudice of these claims. Additionally, the applicants wish to add that the recitation of the reference chamber of originally filed

claims 15-17 and 46, has been incorporated into new independent claims 112 and 180 of the present application. With regard to new claims 112 and 180 and their respective dependents, the applicants submit that Cooper et al., like Kubo et al. shows only a single reference chamber, and Cooper et al., **unlike** Kubo et al., shows only a single sample chamber. The applicants therefore respectfully submit that no combination of Kubo et al. with Cooper et al. can render as obvious, new claims 112 or 180 of the present invention, with their recitation of:

“at least a first sample chamber ..... at least a first reference chamber”, and  
 “at least a second sample chamber ..... at least a second reference chamber”.

Claim 58 stands rejected under 35 U.S.C. 103 (a) as being unpatentable over Kubo et al., in view of Micheels et al (US 5,957,858). The Examiner states that “Kubo does not use a beam homogenizer. Micheels does. Hence, it would have been obvious to modify Kubo to use such a beam homogenizer, as it is merely the substitution of one known equivalent measuring arrangement for another.”

The applicants respectfully submit that the Examiner’s rejection is moot in the light of the cancellation without prejudice of claim 58.

However, in order to relate the Examiners rejection of claim 58 to new dependent claims 164 and 165, which do recite use of a homogenizer, the applicants have reviewed the Micheels et al patent, but were unable to find any direct reference to a separate beam homogenizer. The applicants have made the assumption that the Examiner is referring to the sample chamber of Micheels as the homogenizer. This sample chamber, being a long and narrow waveguide chamber, in the form of a narrow tube with reflective side walls, of length typically 30 to 100 cm, and of diameter 0.3 to 2 mm, does indeed homogenize the beam passing through it, by its waveguiding effect. However, such an arrangement is quite different from the sample chambers described in the present application, and those of Kubo, which have free-space propagation therethrough, and in which, therefore, the addition of a homogenizer does improve the optical functionality of the chambers, and, to the best of the applicants’ understanding, thus does add patentable matter to the claimed

invention.

Consequently, with regard to new dependent claims 164 and 165, even if the teachings of Kubo were to be considered as anticipating those elements of these claims besides the use of the beam homogenizer, which the applicants have submitted above that they do not, the applicants respectfully submit that use of such a beam homogenizer is not merely the substitution of one known equivalent measuring arrangement for another.

Claim 22 is rejected under 35 U.S.C. 103 (a) as being unpatentable over Kubo et al., in view of Rosenfeld et al. as applied to claims 2, 4, 6, 19-21, 25, 34, 36, 48, 60 and 61, and further in view of Micheels. The Examiner states that “(t)he above combination has two separate detectors. Micheels et al teaches using a single detector for two wavelength measurements. Hence, it would have been obvious to modify the above combination to use a single detector, as it is merely the substitution of one known equivalent for another.”

The applicants respectfully submit that the Examiner’s rejection is moot in the light of the cancellation without prejudice of claim 22.

However, the applicants wish to relate the grounds of the Examiner’s rejection of claim 22, to new dependent claim 113 and its dependents, which do recite use of a **single** detector “detecting transmission through said at least first sample chamber and transmission through said at least first reference chamber, ..... and transmission through said at least second sample chamber and transmission through said at least second reference chamber .....” The applicants respectfully submit that, to the best of their understanding, Micheels et al describes an isotopic gas analyzer using a single sample chamber, and no reference chamber at all. The system of Micheels consequently teaches away from the systems of Kubo et al., and of Rosenfeld et al., both of which use reference chambers. The applicants therefore submit that it may not be valid to combine these three patents to render claims of the present application as obvious.

In addition to the above mentioned arguments regarding the inapplicability of combinations of the Kubo et al patent with the other cited patents, the applicants respectfully repeat their contention from above, with respect to the applicants' arguments against the Examiner's rejections under 35 U.S.C. 102(e), that the teachings of Kubo et al do not anticipate any of the new claims of the present application, and that Kubo et al. cannot be used as a basis for rejections under 35 U.S.C. 103(a).

### Claim support

Support for the six elements of new claim 112 may be found in the specification, *inter alia*, as follows:

(i) at least one wavelength-stable source of radiation of wavelengths characteristic of at least one of said at least first and second isotopic components:

Page 4, last para., Page 24, para. 3 and page 28, para. 2.

(ii) at least a first sample chamber comprising a first sample of said gas to be analyzed .....

Page 24, para. 3.

(iii) at least a first reference chamber containing a reference gas comprising said first and second isotopic components .....

Page 24, para. 3, and page 5, para. 3.

(iv) at least a second sample chamber comprising a second sample of said gas to be analyzed.....

Page 24, para. 3.

(v) at least a second reference chamber containing a reference gas comprising said first and second isotopic components .....

Page 24, para. 3, and page 5, para. 3.

(vi)-a at least one detector determining transmission through said at least first sample chamber .....

Page 23, para. 4, and page 27, para. 1.

(vi)-b ...of radiation of wavelengths characteristic of said first isotopic components of said gas .....and .....of radiation of wavelengths characteristic of said second isotopic components of said gas.

Page 5, para. 2.

Support for that element of new claim 180 different from the elements of new claim 112, may be found in the specification, *inter alia*, on Page 7, lines 5-8.

### **Allowable subject matter**

Examiner's indication that original claim 24 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, is gratefully acknowledged by the applicants. The applicants have accordingly rewritten original claim 24 as new independent claim 179.

### **Prior art made of record**

The Examiner has made of record prior art which is not relied upon, but which is considered pertinent to the applicant's disclosure, as follows:

J. Gross (U.S. Patent 5,479,019)

D.E. Murnick (U.S. Patent 5,394,236)

K.P. Weckstrom (U.S. Patent 5,908,789)

The applicants have carefully studied these patents, and to the best of their understanding thereof, none of them affect the patentability of any of the applicants' new claims, either alone or in combination with any of the other cited prior art.

### **Conclusion**

The applicants therefore respectfully submit that, for the reasons mentioned above, all of the new claims 112 - 190 are novel and unobvious over the prior art cited by the Examiner, and recite patentable material. Claims 112 - 190 are therefore deemed to be allowable. Reconsideration and prompt allowance of this application are therefore respectfully requested.



If any additional fees are required to preserve the pendency of the subject application, authorization is hereby given to charge the amount of any such fees to the Deposit Account of the undersigned, No. 01-1785.

Respectfully submitted,

A handwritten signature in dark ink, consisting of several loops and a long horizontal stroke extending to the right.

Michael J. Berger

Reg. No. 25,829

Dated: July 15, 2003